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A new American Phytophthora.

ROLAND THAXTER.

The Lima beans in the vicinity of New Haven, within a radius of at least fifteen miles, have been subject during the present season to a serious disease resulting from the attack of a species of Phytophthora, quite different from the common P. infestans both in its general appearance and microscopic characters. The disease was first observed early in September, in the town of Hamden, where it was causing great damage in "truck" gardens, resulting in the destruction of a large percentage of the crop. The pods at different stages of maturity furnish the favorite point of attack, although the fungus occurs frequently on the young bean shoots, and sometimes, but more rarely, upon the leaves and petioles. On the pods it appears as a clear white felted coating, covering them entirely or forming irregular patches extending usually to both surfaces. The young shoots, although often considerably swollen and distorted, were found to contain no oospores; neither were the latter observed in any of the pods examined. The disease spreads rapidly, like its congener, and the pods, soon after the Phytophthora has appeared on any part of them, fall a ready prey to various saprophytic forms, Cladosporium, Epicoccum, etc., which complete their destruction and cause them to turn black.

The conidia are much larger than those of P. infestans and usually broader in proportion to their length. The conidiophores are also different in their appearance and mode of branching. I was unable to observe the maximum number of zoospores formed in germination; but spores of average dimensions produced from fourteen to sixteen. In a few cases a simple germinal tube was observed, but far more rarely than in P. infestans, while the production of secondary conidia as a result of lateral or terminal germination was also seen in a number of cases. The conidiophores are very commonly quite simple above their point of exit through the stomata; but more often arise two or more from a common, slightly swollen, base, above which they may be simple or once dichotomously branched. During long continued

moist weather or when kept in a damp chamber the conidiophores become indefinitely elongated and irregularly branched: but the single dichotomous form is characteristic of the species. Towards their extremities the conidiophores are furnished with the successive vesicular swellings, marking the point of proliferation from the insertion of previously formed conidia, which are characteristic of the genus.

In its large size the species approaches the European P. Cactorum; but, although I have not been able to examine specimens of this species, it seems to differ essentially from the one under consideration, both in its larger size and mode of branching. Prof. Farlow informs me that a specimen distributed in the Mycotheca Marchica on Brassica, and labelled "P. omnivora" (a form which, together with P. Fagi and P. Sempervivi, has been shown by de Bary[1] to belong to a single species, P. Cactorum) approaches the present species in its luxuriant habit; but on examination proves to be merely Peronospora parasitica.

Phytophthora Phaseoli nov. sp.

Mycelial hyphæ branched, rarely penetrating the cells of the host by irregular haustoria. Conidiophores slightly swollen at their point of exit through the stomata, arising singly or one to several in a cluster; simple or once dichotomously branched, and once to several times successively inflated below their apices. Conidia oval or elliptical, with truncate base and papillate apex; 35–50μ × 20–24μ. Germination by zoospores, usually fifteen in number, or rarely by a simple hypha of germination. Oospores unknown.

On pods, stems and leaves of the Lima bean (*Phaseolus lunatus*), New Haven, Connecticut, September and October.

New Haven, Conn.

Notes on North American Umbelliferæ. I.

JOHN M. COULTER AND J. N. ROSE.

The series of papers bearing the above title are intended to be supplementary to our *Revision of North American Umbelliferæ*.

CAUCALIS MICROCARPA H. & A. has been sent by C. R. Orcutt from Lower California.

[1] Bot. Zeit. 1881, pp. 251–265.

CUMINUM CYMINUM L., the common "cumin" of Mediterranean countries, was found by Charles Wright, in 1852, in cultivation at El Paso, Texas. In May, 1881, Mr. J. G. Lemmon found it growing spontaneously along the banks of the Rio Grande on the island of Isleta (opposite El Paso). It is a small, slender annual 3 to 10 in. high, with long filiform leaflets and similar involucre and involucels, awl-shaped sepals, rose-colored petals, fruit with long hairs and bristles, and oil-tubes solitary under the secondary ribs. The genus is near *Trepocarpus*.

ANGELICA ARGUTA Nutt. was found in the "Coast Mountains" of Oregon, July, 1888 (*Howell* 779), and on Mt. Rainier, Washington Territory, August, 1889, at an elevation of 6,000 feet (*Piper & Smith* 630).

SELINUM HOOKERI Watson is sent in fine condition from near Seattle, Washington Territory, collected September, 1888 (*C. V. Piper* 631). Mr. Piper writes that it grows "just above high tide mark on the seashore." The plant attains 4 feet in height; the lower leaves are often very large, and 3 to 4-pinnate; the rays become over 1½ inch long; and the fruit is sometimes 3 or 4 lines long.

TIEDEMANNIA FENDLERI C. & R. Prof. E. L. Greene has sent some robust specimens collected along Bear Creek, Colorado, July 2, 1889, which have some of the leaves 11-foliolate, and the leaflets incisely dentate rather than "incisely serrate."

LEPTOTÆNIA ANOMALA C. & R. was collected during the past season by T. S. Brandegee, at Carbondale, California. The type specimens of this very distinct species showed fruit only and the leaves were very imperfect. The specimens of Mr. Brandegee supplement our information and enable us to complete the description. The leaves are first ternate, then pinnate into distant narrowly linear segments, and the flowers are yellow. The plant blooms in April and perfects fruit in June.

PEUCEDANUM GRAVEOLENS Benth. & Hook., the cultivated "anise" or "dill," is sent by Dr. H. E. Hasse from Los Angeles, California, where he says it is "escaped and apparently established." It is *Anethum graveolens* L., having fennel-like leaves, but the fruit of a *Peucedanum*.

PEUCEDANUM VILLOSUM Nutt. has been observed by Dr. V. Havard growing in abundance near Fort Buford, Dakota.

PEUCEDANUM AUSTINÆ C. & R. has been collected by J. G. Lemmon in Plumas county, California (no. 23). The

species seems to be well marked in fruit by the small oil-tube contained in each of the dorsal and intermediate ribs, but Mr. Lemmon's specimens show a minutely pubescent foliage. The reference to Mr. E. L. Greene's plant (Rev. Umbell. 66) should be changed so as to read Siskiyou county, 1876 (no. 732).

PEUCEDANUM MARTINDALEI C. & R., var. ANGUSTATUM C. & R., has been sent from near Ellensburg, Washington, by G. R. Vasey, August, 1889. His specimens show that the inflorescence may be somewhat puberulent as well as glabrous.

PEUCEDANUM CANBYI C. & R. has been collected by Dr. V. Havard in the Spokane River region of Washington.

Peucedanum Hassei. Tall caulescent, stout, 2 feet or more high, glabrous and somewhat glaucous, from a long slender woody root: leaves biternate, on very long petioles (sometimes as much as 10 in. including petiole); leaflets broadly ovate with wedge-shaped base, irregularly lobed, coarsely mucronate-toothed, 1 to 4 in. long, reaching 2½ in. in breadth: umbel long-peduncled, equally 8 to 18 rayed, with involucels of bractlets which vary from rather short linear-setaceous to oblanceolate, foliaceous, entire or toothed and much exceeding the rays: rays 2 to 4 in. long: pedicels 6 to 8 lines long: flowers yellow: fruit glabrous, with broad wings: oil-tubes solitary in the intervals.

Los Angeles county, California, March 27, 1888 (*Dr. H. E. Hasse*). Distributed as *Ferula Californica*.

This is an interesting addition to the *Euryptera* section on account of its tall caulescent habit, and in this respect the section character should be modified. In its general habit it bears some resemblance to *Leptotænia Californica*, but can be distinguished from that species even by its leaflet characters, while the fruit is evidently that of *Peucedanum*.

Peucedanum Torreyi. Short caulescent, 3 to 12 in. high, glabrous, slender, clothed at base with old leaf-sheaths: leaves small, ternate-pinnate or bipinnate, with very short (1 to 3 lines) linear acute-tipped segments: umbel unequally few-rayed, with involucels of 1 or 2 small bractlets or none: rays an inch long or less: pedicels a line or two long: flowers yellow: calyx-teeth small or obsolete: fruit narrowly oblong, 4 to 6 lines long, with wings not half as broad as body: oil-tubes solitary in the intervals.—Described without name in Bot. Calif. i. 263, as a plant closely allied to *Podosciadium*.

Yosemite Valley, California (*Torrey & Gray; M. K. Curran* 16, June, 1883).

This very distinct little *Peucedanum* was first collected by Drs. Torrey & Gray in immature condition. In 1883 it was rediscovered by Mrs. M. K. Curran in so much better condition that its generic relationship is evident. It is most nearly related to *P. Oreganum* and *P. Parryi* in habit and structure, but is very distinct in fruit characters, having narrower and longer fruit, unusually narrow wings, and solitary oil-tubes.

Peucedanum evittatum. Acaulescent, 8 to 18 in. high, from a deep-seated small tuber, glabrous: leaves once or twice ternate then more or less pinnate into linear callous-tipped segments (½ to 2 in. long): umbel somewhat unequally 8 to 18-rayed, with no involucre, and involucels of numerous purplish lanceolate acuminate gamophyllous bractlets: rays 1 to 2 in. long: pedicels short (1 to 1½ lines): flowers white: fruit oblong, glabrous, 4 to 5 lines long, 2½ lines broad, with very thin membranous wings more than half as broad as body, and no oil-tubes.

Ellensburg, Spokane county, Washington, May, 1889 (*G. R. Vasey*).

In the absence of oil-tubes this species is entirely different from all our known species of *Peucedanum* excepting *P. bicolor;* and it notably differs from that species in its broad thin fruit-wings and prominent gamophyllous involucels. It would properly come in the tuberous-rooted section of our *Revision*, probably nearest to *P. Canbyi*, but it contradicts the section characters, as there drawn up, in its broad fruit-wings and absence of oil tubes. Its affinities seem also to be very close with *P. bicolor*, which sp cies it most resembles in habit.

Peucedanum Lemmoni. Caulescent, with most of the leaves near the base, 12 to 15 in. high, clothed at base with old leaf-sheaths, from an elongated rather slender root, glabrous: leaves broad triangular in outline (5 to 8 in. long including petiole), twice or thrice pinnate (or so broad as to appear at first ternate), the ultimate segments linear (1 to 2 in. long); uppermost leaves much smaller and simply pinnate: umbel 6 to 8-rayed, with no involucre, and involucels of a few almost filiform bractlets: rays short (3 to 7 lines long), making the fruits appear in a head-like cluster; pedicels a line long: flowers white (?): fruit oblong, glabrous, 2½ lines long, scarcely 2 lines broad, with thickish wings about half as

broad as body, and distinct dorsal and intermediate ribs: oil-tubes solitary in the dorsal intervals, 2 or 3 in the lateral, 4 to 6 on the commissural side: seed-face plane.

Huachuca Mountains, S. E. Arizona, June, 1887 (*Lemmon* 392).

The appearance of the leaves of this species is quite unusual for *Peucedanum*, but its affinities with that genus are clear. The specific relationship is not so clear. Mr. Lemmon writes that the plant seems very rare.

Peucedanum Plummeræ. Short caulescent with a cluster of stout widely spreading peduncles (8 to 12 in. high) rising much above the leaves and from a thick tuberous root, glabrous and somewhat glaucous: leaves ternately decompound, the numerous crowded ultimate segments very small, oblong, more or less confluent: umbel very unequally 6 to 12-rayed, with no involucre, and involucels of numerous lanceolate acuminate bractlets; rays ½ to 3 in. long; pedicels 2 to 4 lines long: flowers white: fruit oblong but usually acute at apex, glabrous, 4 to 4½ lines long, 2 to 2½ lines broad, with wings from half as broad as body to fully as broad, and indistinct dorsal and intermediate ribs: oil-tubes 2 to 3 in the intervals, 4 to 6 on the commissural side.

California, Sierra Valley, Sierra county, May, 1889, and near Shasta, Shasta county, June 28, 1889 (at both stations by *Mr. & Mrs. J. G. Lemmon*, 32 and 40).

This species seems most closely related to *P. Nevadense*.

Ligusticum scopulorum Gray. The range of this species must be extended so as to include Sierra county, California (*Lemmon* 19), and the coast mountains of Oregon (*Howell* 708).

Ligusticum Porteri C. & R. was collected in S. Utah in 1877 by Dr. E. Palmer (no. 176).

Ligusticum apiifolium Benth & Hook. has been collected in Pierce county, Oregon (*C. V. Piper* 644).

Ligusticum Grayi C. & R. was collected, August 20, 1889, by Prof. E. L. Greene, on "open ground, near timberline, Mt. Rainier, Washington; and by Prof. John Macoun, August 5, 1889 (in flower), on "mountains north of Griffin Lake, B. C., at 6500 ft. altitude. Specimens collected on Mt. Rainier, Washington, altitude 5,000 feet (*Piper & Smith* 629) show smaller fruit than recorded before, some being but 1½ lines long; but they occur along with many of recorded size.

Ligusticum filicinum Watson was collected in great abundance near Lake City, Colorado, by E. J. Ebert, in 1888,

and in the mountains back of Denver by John Kochan in July, 1889. This is the "Osha" of the Indians, who use its very large aromatic roots. It was referred to *L. apiifolium* by Rothrock in report of Wheeler's Expedition, who collected it about Twin Lakes, Colorado.

CŒLOPLEURUM GMELINI Ledeb. In our Revision of N. Am. Umbelliferæ (p. 90) we ventured the opinion that this species would be found along the coast of Washington Territory, and now Mr. C. V. Piper sends abundant material from near Seattle, where it grows just above high tide mark or in salt marshes on the sea-shore. The specimens are very stout, becoming 3 or 4 feet high, and the leaves are very large, the leaflets tapering at both extremities and conspicuously reticulate-veined, 2 to 4 inches long and 1 to 2 inches broad. The rays are also sometimes nearly 3½ inches long and the pedicels 4 to 8 lines. The fruit is more narrowly oblong than usual, averaging about 1½ lines in breadth by 3½ lines long. The seed soon becomes very loose in the pericarp and has a distinct lunate outline in section. The "hollow ribs" of Ledebour's description appear very prominently, and undoubtedly these specimens from Puget Sound represent more nearly those of Ledebour than any others we have seen.

ŒNANTHE SARMENTOSA Presl., as is to be inferred from the name, has a decidedly sarmentose habit. Our attention has been called to it by S. B. Parish in S. California, and by L. F. Henderson and E. L. Greene in Washington. Professor Greene describes it as follows: "The stems, though slender, are erect, but after flowering there go forth from among the umbels and upper axils long slender sterile branches which strike root at the joints or tip."

CYNOSCIADIUM PINNATUM DC. Mr. F. W. Thurow has sent from Texas a large coarse form of this species 2 feet high. He has also collected this year the var. *pumilum*.

Eryngium Lemmoni. Glaucous: stem erect, branching above, 1 or 2 feet high: leaves rigid, from long oblanceolate below to broad ovate above, all sharply dentate or pinnatifid-toothed (but not pectinate), the uppermost leaves most deeply cut, teeth cuspidate-tipped: heads short-oblong (4 to 6 lines high), much surpassed and enveloped by the conspicuous involucre of broadly cuneate (becoming 4 or 5 lines broad) leaf-like cuspidate-toothed and -lobed bracts; bractlets scarcely exceeding the flowers and rather weak, the

terminal ones not at all prominent: fruit with short ovate cuspidate-tipped calyx-lobes, and long slender styles.

Chirricahua Mountains, S. E. Arizona, September, 1881 (*J. G. Lemmon* 17).

This species is most nearly allied to *E. Wrightii* Gray, but the leaves are broader and much less finely cut, and the very conspicuous involucral bracts are unlike those of any other North American *Eryngium*.

SANICULA NEVADENSIS Watson is sent by S. B. Parish from the San Bernardino Mountains, California, thus extending the recorded range southward. It is his no. 2085, and is said to grow on "dry ridges, 4000 ft. altitude."

SANICULA LACINIATA H. & A., was collected on Mt. Tamalpais, California, March 30, 1889, by Prof. E. L. Greene.

SANICULA MENZIESII H. & A. has been found by C. R. Orcutt in N. Lower California, where it blooms as early as March.

SANICULA BIPINNATA H. & A. was collected by Mr. Thos. Howell (no. 799), April 1889, in N. California and S. Oregon, thus extending the known range of this species considerably northward. Mr. Howell's plants are lower and more bushy-branching from the base than heretofore noted. They range from 3½ to 8 in. high above ground.

SANICULA BIPINNATIFIDA Dougl. should be credited with larger fruit than given in our *Rev. Umbell.* (p. 106). Numerous specimens show fruit reaching 2 lines in length.

FŒNICULUM VULGARE Gærtn., the "cultivated fennel," seems to be common in California. It is reported by Prof. E. L. Greene as abundant, and is also sent by Dr. H. E. Hasse from Los Angeles, where he reports it as "escaped and apparently established."

APIASTRUM ANGUSTIFOLIUM Nutt. has been collected in San Diego county, California (*Orcutt*), Lower California, flowering in February (*Palmer* 643), and on Cedros Island (*Palmer* 679), all in 1889. It is the only known umbellifer on Cedros Island, where it grows "under bushes in cañons."

MUSENIUM DIVARICATUM Nutt. has been sent in fine condition by Dr. V. Havard from Fort Buford, Dakota, where it occurs in great abundance. We find that the seed-face may be plane as well as somewhat concave.

MUSENIUM TENUIFOLIUM Nutt. has at last been rediscovered in fruit. In our Revision (p. 111) we stated that the fruit had been lost from the type specimens and questioned the generic relationship. Fine fruiting material has been

sent by Mr. H. J. Webber, of the Nebraska State University, who collected it in the northwestern part of Nebraska, where he says it is very common. Dr. Bessey found it at Belmont, Dawes county, early in July, and later it was collected in the same locality by Mr. Webber, who also found it quite common on high ridges in Sioux county, on Hat Creek Basin divide. Its relation to Musenium is undoubted, and Nuttall's opinion amply confirmed.

EULOPHUS BOLANDERI C. & R. is sent from Sierra county, California, by Mr. J. G. Lemmon (no. 47).

EULOPHUS PRINGLEI C. & R. was found by Mrs. R. W. Summer, at "Chalcedon Hill," San Luis Obispo, California, during the last season, "in stony open ground."

EULOPHUS PARISHII C. & R. (Rev. Umbell. 112). Abundant material of this species from C. R. Orcutt enables us to recast certain parts of the description, especially with reference to the very variable leaves: Plant becomes as much as 3 feet high: leaves ternate (rarely biternate), on petioles 2 to 5 inches long (the whole leaf, including the petiole, sometimes reaching a foot in length), with narrowly linear (almost filiform) to narrowly lanceolate leaflets (1 to 3 in. long, ½ to 5 lines wide), terminal leaflet often distant: uppermost leaves simple and bract-like: fruit 1 to 2 lines long, ½ to 1 line broad.

Cuyamaca Mountains, San Diego county, California, July 1889 (*Orcutt*), and also probably *Palmer*, in 1875, from the same county.

The range of this species is thus extended to the southern limit of California. Mr. S. B. Parish writes that he is "satisfied that all he took for *Carum Gardineri* in the San Jacinto and San Bernardino Mountains is *E. Parishii*," and pertinently raises the question whether *Carum Gairdneri* really grows in S. California. Our range for that species given in *Rev. Umbell.*, is a general one, and we have yet to see genuine *C. Gairdneri* from S. California.

Var. **Rushyi.** Leaflets filiform to linear, becoming as much as 6 in. long; fruit larger, about 2 lines long, 1½ lines broad.

Arizona, Bill Williams Mountain, July 11, 1883 (*Rushy* 629), Flagstaff (*Lemmon*).

SCANDIX PECTEN L. is reported by Professor E. L. Greene (*Pittonia* i. 270) as naturalized in Napa Valley, California (*C. F. Sonne*). It is a low branching annual, with pinnately decompound leaves, few-rayed umbels, and a remarkably

long-beaked fruit. In fruits becoming sometimes 2 in. long, more than three-fourths of this length is occupied by the stiff flattened beak. This is the "shepherd's needle" or "Venus-comb" of Europe and W. Asia, a common weed of the fields.

CHÆROPHYLLUM ANTHRISCUS Lam., a common weed of Europe, known as "burr chervil," has been found by J. G. Lemmon growing in the streets of Alameda, California. Prof. E. L. Greene sends the same plant, having been collected at the same station by Dr. Gibbons, May, 1889. It is *Anthriscus vulgaris* Pers.

OSMORHIZA BRACHYPODA Torr. is sent by C. R. Orcutt from near Julian, San Diego county, California, collected in May, 1889, thus extending its recorded range southward. He writes that it is called "ginsheng," and is of considerable medical value.

VELÆA ARGUTA C. & R., var. **ternata**. More robust and taller (2 to 2½ feet high): leaflets larger (2 to 3 in. long) and broader, irregularly and sharply toothed, becoming more or less 3-lobed; the lowest pair with long petiolules (inch or more), giving a ternate appearance to the leaf: umbel 14 to 18-rayed.

Cuyamaca Mountains, San Diego county, California, July, 1889 (*Orcutt*): probably also *Palmer* 110a, a very immature specimen collected in 1875 in the same locality. Mr. Orcutt's specimens bring us for the first time good fruit of this species.

SIUM CICUTÆFOLIUM Gmelin, was collected in marshes of Lake Pend d'Oreille, Idaho, August 9, 1889, by Prof. E. L. Greene. The specimens show very dissected submersed leaves.

CARUM L.—Professor E. L. Greene (*Pittonia* i. 272) has adopted the views of Hooker & Arnott in separating our Pacific species from the Old World genus under the name *Altænia*. If such a separation is possible of course this generic name is inevitable. Aside from the fact that such a separation must involve a study of the numerous Old World species, we can not discover that the autumnal habit of blooming and fruiting can be made to hold in all our species, for our collections show dates of good specimens beginning with May and ending in October. Specimens of *C. Kelloggii* just received from Prof. Greene, collected in March, show abundant and vigorous leaves, while others collected in August have flowers and fruit and mere remnants of leaves. This apparently common habit of *C. Kelloggii* is a point well taken, but until

it is proved constant for that species, and a character in common with the other species, and also supported by other characters, we can not consider it a sufficient reason for separating genera.

CARUM KELLOGGII Gray. The recorded range of this supposed rare species has been increased by its discovery in abundance in Tuolumne county, California, August, 1889 (*Lemmon* 72–74), thus extending it throughout the central part of the state, where it is known as "wild anise." Professor E. L. Greene thinks its scarcity in herbaria is due more to its late blooming and fruiting than to its actual rarity. We also have it from Mr. Lemmon from the "Oakland Hills." Some of the Tuolumne specimens showed plants 5 feet high.

CARUM OREGANUM Watson was also collected in good fruit by Mr. Lemmon in Siskiyou county, California, June, 1889.

CARUM GAIRDNERI Benth. & Hook. we have not yet seen from S. California, and would ask collectors to note whether the specimens reported from that region are not really *Eulophus Parishii*.

Carum Lemmoni. Resembling *C. Oreganum* except in the fruit, which is oblong, 1½ lines long and a line wide, with prominent calyx-teeth concealing the small stylopodium, and broad low ribs each containing a small group of strengthening cells.

"Tuolumne forest," California, August 1889. (*Lemmon* 79).

The small stylopodium and the presence of strengthening cells are characters unknown among our other species of *Carum*. In dried specimens the fruit ribs look sharp and prominent, but this is explained by the collapsed condition of the large intervening oil-tubes. After soaking, the oil-tubes become plump, and the ribs are then seen to be broad and low.

TÆNIOPLEURUM, nov. gen. Calyx-teeth prominent. Fruit oblong, glabrous, flattened laterally. Carpel with broad salient ribs, each tipped with a large group of strengthening cells. Stylopodium prominent and conical. Oil-tubes solitary in the intervals, very large, 2 on the commissural side, and a small accessory one beneath each group of strengthening cells. Seed dorsally flattened, sulcate beneath the oil-tubes, becoming loose in the pericarp and invested by a layer of secreting cells, the face plane or somewhat concave.—Smooth, erect herbs, from a fascicle of thickened fibres, with

ternate-pinnate leaves, toothed (unusually broad) leaflets, involucre and involucels of numerous and conspicuous bracts, and white flowers.

T. Howellii. Stem rather stout, 3 to 3½ feet high; leaves few, ternate then once or twice pinnate; leaflets lanceolate to ovate, strongly toothed or lobed; umbels many-rayed, with involucre of long narrowly oblanceolate bracts (becoming reflexed), and involucels of prominent lanceolate scarious-margined bractlets; rays 1½ to 2½ in. long; pedicels 3 to 5 lines long; fruit 1½ to 2 lines long.—*Carum Howellii* C. & R. Rev. Umbell. 129. *Atænia Howellii* Greene, Pittonia i. 274.

Wet places, Grant's Pass, Oregon, July, 1887, in flower: also 1888, in mature fruit (*Howell* 710).

An abundance of fine fruiting material collected by Mr. Howell has enabled us to determine the affinities of this heretofore puzzling species. In our Revision of N. Am. Umbelliferæ we hesitated to include this species under *Carum* on account of its unusual leaves and bracts, but in the absence of fruit we left the matter in doubt. Now that mature fruit has been discovered, characters are found which plainly separate it generically from *Carum*. The prominent ribs, containing large groups of strengthening cells and accessory oil-tubes, are among the most noticeable features, while the investment of the seed with an oil-secreting layer in which are frequently developed small oil-tubes, and its becoming loose in the pericarp, are perhaps no less so. When to such characters as these there are added the broad toothed leaflets and very prominent bracts of both involucre and involucels, an unusually strong combination of characters is made upon which to establish a genus. The name refers to the fact of oil-tubes being found in the ribs.

CICUTA BULBIFERA L. has at last been collected with mature fruit. It comes from Mr. O. A. Farwell, Keweenaw county, Michigan. The fruit is quite small, a line long by half a line broad, and is broadly ribbed.

BERULA ANGUSTIFOLIA Koch is sent by Prof. John Macoun, have been collected at several stations in British Columbia.

Crawfordsville, Ind.

Study of Montana Erysipheæ.

F. D. KELSEY.

In the author's experience, a wide difference exists in Montana as to the relative quantity of the *Erysipheæ* and the *Uredineæ*, the latter being by far the more numerous and on a wider range of hosts; but the *Erysipheæ*, where they do occur, are beautiful in form, abundant on the hosts, and marked in perfection of development.

ERYSIPHE LINKII Lév. Found on our prominent and abundant *Artemisia Ludoviciana* Nutt. I obtained these plants in Helena, Montana, September 17, 1888, and also in September, 1889. A careless observer would not see the fungus at all, or mistake it for particles of dust. It is evident enough in herbarium specimens, but the whole appearance of the host is such as to make it hard to see the fungus on the living plant. The identification of this species was made by Mr. E. W. D. Holway, of Decorah, Iowa, to whom the author owes a debt of gratitude for kindness and attention.

ERYSIPHE COMMUNIS (Wallr.) Fr. (1) On *Aster commutatus* Gray, September, 1888, at Helena. This host has been doubted by one eminent botanist and reaffirmed by another. If it be not A. commutatus it comes far too near to be separated into even a good variety, unless botanists are willing to multiply species. Whether the fungus be abundant can not now be told. Only once have I collected it on this host, and then obtained but a few inferior specimens. (2) On *Ranunculus Cymbalaria* Pursh. This host is an abundant one in Montana, and is most richly covered with the fungus in September and October. The host grows only a few inches in height, and always in damp places, thus inviting most genially the visits of the fungus. (3) On *Geranium Richardsoni* Fisch. & Mey. This specimen was collected at Sand Coulee by my friend, Mr. F. W. Anderson. The perithecia are very few, an unusual and possibly accidental matter. (4) On *Gutierrezia Euthamiæ* Torr. & Gray. This specimen was also found by Mr. Anderson, and its date is remarkably early, July 27, 1888. The host is but slightly affected, and no eye but that of a skilled observer would ever have seen the fungus, yet it is on both stem and leaves. (5) On *Lupinus parviflorus* Nutt. Perithecia abun-

dant and very evident, tending to greater abundance on the upper side of the leaves; development late. This specimen was collected at Deer Lodge, in October, 1888. (6) On *Œnothera albicaulis* Nutt. It develops early. The only specimen I ever saw was sent me by Mr. F. W. Anderson, collected at Sand Coulee, July 24, 1888. It is conspicuous, fairly covering some of the leaves, as on Ranunculus Cymbalaria. (7) My 1888 list calls for this fungus on *Amelanchier alnifolia* Nutt., but the paper has been lost. Some of my correspondents will have it, marked $\frac{88}{109}$. (8) This year this fungus has been remarkably abundant on *Astragalus Canadensis* L. It came early, even in August, and is still developing the last of September. Both sides of the leaflets are as black with perithecia as if painted. (9) *Ranunculus sceleratus* L. But a very small amount of this has been obtained.

Erysiphe sepulta E. & E. n. sp. This species is so named only provisionally, and may yet prove to be only an old species under peculiar circumstances. It grows on the leaves and stems of *Bigelovia graveolens* var. *albicaulis* Gray. Found in September and October and even in November, at Helena. It comes so near to E. cichoracearum that it may well be doubted if it be a new species; but the perithecia appear embedded in the woolly coat of the host. If after further study this can be proved to be a constant distinction, Ellis and Everhart will publish it as one of my new species.

ERYSIPHE CICHORACEARUM DC. (1) On *Solidago serotina* Ait. Abundant in September. Perithecia deeply colored brown and very abundant, with a most decided preference for the upper surface of the leaves. Most of my hosts are clean on the underside, revealing under the glass a perithecium here and there, but usually not to be seen with the unaided eye. (2) On *Aster lævis* L., September, 1888. Much like that on Solidago serotina. Not seen in 1889. (3) On *Bigelovia Douglasii* Gray. This host grows abundantly around Helena, yet I have never seen the fungus on any of our B. Douglasii. Mr. F. W. Anderson obtained my specimen in October 1888, on the McCarthy Mountains, near Willis. This specimen shows mycelium scarce, with comparatively abundant perithecia. Mr. Anderson marked the identification with an interrogation. Examination reveals the asci suspiciously elongated in comparison with the width; otherwise it is as E. cichoracearum. (4) On *Aster foliaceus* var. *Eatoni* Gray. Collected by Mr. F. W. Anderson on

banks of the Missouri river, September, 1888. (5) On *Artemisia Ludoviciana* Nutt. Sent by Mr. Anderson; but on examination I see no difference from the specimens of mine identified by Mr. Holway as E. Linkii. (6) On *Erigeron glabellus?* Elkhorn, Montana, September 10, 1889. The fungus was rather immature, growing on a high mountain peak, on a host too far gone for sure identification of species, but which looked like a dry season mountain form of Erigeron glabellus. (7) On *Helianthus annuus* L., Helena, September 2, 1889. The fungus covered the host on both leaf surfaces. The host grew on a damp spot along a railroad. (8) On *Helianthus Californicus* var. *Utahensis* Gray, *leg.* F. W. Anderson. Host black on both leaf surfaces with the fungus. Collected September 2, 1889. (9) On *Aster* sp., Bozeman, June 20, 1889, by Mrs. M. L. Alderson. Remarkable for its exceedingly early date. (10) On *Verbena hastata* L., Helena, September 2, 1889. Exceedingly abundant on its host, appearing first and ripening on the lower leaf surface, and then spreading to the upper. (11) On *Cnicus undulatus* var. *canescens* Gray, Helena, September 2, 1889. Abundant. When collected I took it for a Puccinia. (12) On *Stachys palustris* L., August 26, 1889, Helena. This seems, from statements in *Ill. State Lab. Bulletin* ii. art. vi., as though it ought to be E. galeopsidis, but I can not find the haustoria lobed. (13) On *Phacelia circinata* Jacq. f., Silver City, July 8, 1889. Fungus rather too immature for certainty, yet every indication is that it belongs here. I have never seen it before upon this host. It grew beside a damp meadow (14) On *Echinospermum Redowski* Lehm., July, 1889, Helena. Funguss parse and rather too young. Appeared to affect the host very materially.

Erysiphe graminis DC. Of this fungus there are two specimens in my herbarium, both obtained by Mr. Anderson in Northern Montana, one upon *Poa tenuifolia* Nutt., Sand Coulee, July, 1888; and the other upon *Agropyrum glaucum* R. & S., *leg.* F. W. Anderson, Great Falls, August, 1888.

Uncinula Salicis (DC) Winter. On *Salix flavescens* Nutt., September, 1888. Exceedingly abundant in 1888, but very scarce in 1889, possibly because of the extreme dryness this year and the early severe frosts. On *Populus tremuloides* Michx., September, 1888, it covered the leaves on the upper side. While this fungus is so common the world over, it never fails to interest the student by its beauty and abundance of perithecia. I have it from Prof. A. B. Seymour,

collected August 30, 1884, in Dakota, on *Salix flavescens;* and September 8, 1884, at Bozeman, on *Salix rostrata* Richardson.

PHYLLACTINIA SUFFULTA (Reb.) Sacc. (1) On *Cornus stolonifera* Michx., collected at Helena, September 7, 1888. Its habit is opposite to that of Uncinula, for it grows almost exclusively on the underside of leaves. A hand lens will show here and there an isolated perithecium on the upper surface, while the lower will be one mass of perithecia. (2) On *Betula* sp., Helena, October 1, 1888. The same general habit as noticed on Cornus, but not so abundant.

PODOSPHÆRA OXYCANTHÆ (DC.) DBy. On *Prunus Virginiana* L., Helena, September 17, 1888. Mycelium persistent, evident; perithecia dark brown and exceedingly abundant, sometimes almost covering the entire leaf on both sides. In 1889 no signs of it have been observed on the same trees which bore it so richly in 1888.

SPHÆROTHECA MORS-UVÆ (Schw.) B. & C. On *Ribes floridum* L., October 8, 1888. As yet this fungus on this host has proven exceedingly scarce, yet no apparent reason has been observed.

In the study of Montana fungi I would acknowledge my indebtedness to Messrs. Ellis, Holway and Anderson.

Helena, Montana.

BRIEFER ARTICLES.

The policy of the trustees of the Missouri Botanical Garden.—At a recent meeting the trustees of the garden adopted the following outline of general policy to be pursued in the development of the important institution left to their charge:

To maintain or even augment the present ornamental features of the garden.

To add to the botanical usefulness and interest of the collection by the introduction of American plants, so that, other things being equal, these shall ultimately be largely represented, and may even preponderate outside of the green-houses, giving then in the garden an epitome of the characteristics of our native flora.

To carry into execution, as rapidly as possible, a system of correctly naming and labeling all plants in the grounds with the exception of such as may be used in ribbon-gardening or for other exclusively ornamental purposes.

To provide fire-proof quarters for the invaluable herbarium of the

late Dr. George Engelmann, and to immediately mount it in the proper manner, so as to insure its preservation and availability for scientific use. Also to provide for and add to the general herbarium (based on that of Bernhardi) now at the garden, with the special object of making it complete in good representatives of American plants.

To arrange, bind, and index the books and pamphlets at the garden. Also to provide more ample, but equally safe, accommodations for the library, to bring it up to date as rapidly as possible, to enter subscriptions to periodical publications, and to keep it abreast of the times and in the most useful form by the purchase of important publications as they shall appear, and by the proper indexing of periodicals and pamphlets.

To secure a botanical museum containing material needed for study or calculated to advance general or special knowledge of botany.

To direct the main effort of research for the present toward aiding in the completion of a systematic account of the flowering plants of North America, by the publication of monographs of different orders and genera—illustrated when this may seem desirable; and to especially cultivate representatives of such groups for purposes of study.

To gradually acquire and utilize facilities for research in vegetable histology and physiology, the diseases and injuries of plants, and other branches of botany and horticulture, as special reason for developing one or the other may appear.

To make the facilities of the garden useful in botanical and horticultural instruction, as they increase and opportunity for such work appears; meantime in all feasible ways to attract to the School of Botany students of promise, and to provide for their instruction and the best use of their time as investigators.

To take steps looking to the early appointment of a number of "garden-pupils"—youths with at least an elementary English education, who shall be regarded as apprentices in the garden, working under the direction of the head gardener and foremen, and shall hold scholarships sufficient for their living expenses, together with free tuition in the School of Botany; and who, after having worked for several years in the different departments of the garden, and proved proficient in its practical work, may be admitted to examination for a certificate of proficiency in the theory and practice of gardening.

To have in mind, in appointing associates for the director, their special aptitude in some one of the branches indicated above, so that with each appointment the efficiency of the institution for instruction and original work may be broadened and increased. * * *

The fruit of Ribes aureum Pursh.—This fruit is said to be "yellowish, turning blackish." Here when fully ripe it is a bright almost orange yellow color, and does not change to darker after falling to the ground or drying on the bushes or being dried in the press. But this year I have

found a variation never before noticed here. Occasionally parties out picking berries have come home and described a new currant to me, a black currant growing with the yellow kind, and tasting the same. This "black" fruited form is not common, only a bush being found here and there, growing side by side with those bearing yellow fruit. There is, I find, an intermediate form bearing red berries. This form is usually very low (one to two and a half feet high) and "scrubby." I also find that the "black" berries are not black but a very dark red, so dark as to appear black in fully ripe berries. The plants bearing them exhibit no perceptible difference in size, mode of growth, or color and shape of foliage, and the flower and size of the fruit is the same. The contrast formed by bushes growing side by side bearing berries of these two rich colors is very striking.—F. W. ANDERSON, *Great Falls, Montana.*

Notes on Minnesota Plants.—*Geranium maculatum.* In the Mississippi valley form the leaves do not become "blotched with whitish as they grow old."

Ludwigia palustris. The manual says: "Pods not tapering at the base." In our form they are tapering. Otherwise the description agrees. I would add that the pods have eight slight wings or ridges, four green, and alternating with them four white.

Actæa alba and *A. rubra.* These two plants grow side by side on our bluffs. Being unable to see the least difference between leaves and flower clusters, I marked several spots to study the fruits. In one place I found about a dozen or more plants in one patch hardly a square yard in extent. When I looked for the fruit, part of the clusters of berries were white, part red. Is it proper to keep these two forms separate as valid species?

Cassia Chamæcrista. Our plant has all ten stamens purple, and not "four of them yellow." Furthermore, the stem here is not spreading; the plant stands rather quite erect.

Mentha Canadensis. I noticed two forms. One form has the stem nearly smooth, with minute reflexed hairs scattered: leaves rather narrow; flower clusters quite small; flowers pale, only about one-half the size of those in the next form, with green calyx: stamens with red, when old with brown included anthers, reaching barely to the base of the corolla lobes. The second form is more hairy under the hand lens; the leaves are wider; both clusters and flowers themselves are much larger, the latter more colored, with calyx tinged red: stamens long exserted, longer than the style, which is about as long, relative to the flower, as in the first form and colored, while in the first form it is almost white.

Lycopus Europæus, var. *sinuatus.* Our forms have no sterile filaments, so far as I can find, and I have examined a great many. I distinguished three forms, which showed variations that would puzzle the beginner. In one form the leaves are broad and only slightly sinuate: flower clusters small;

stamens and style about as long as the upper lip of the corolla, which is uniformly of a pale lilac. A second form has narrower, more deeply sinuate leaves; flower clusters larger; corolla on the three lobes of the lower lip irregularly spotted with purple; style well exserted, its two lobes rather longer than in the first form. A third form has leaves and flower clusters as in the second form, but the flowers have no spots on corolla, and style not exserted, but only as long as upper lobe of corolla.—JOHN M. HOLZINGER, *Winona, Minn.*

A deep-water Nostoc.—With the first gales of November and March each year there appears upon the shore of Lake Michigan an abundance of an interesting form of Nostoc. It was first observed in 1864 by Professor Oliver Marcy. Thrown out upon the shore by the waves, it appears as small brown, purple and green balls or thalli. These are not always round, but frequently ovoid, and the larger specimens broadly flattened. Generally they are globose, with a firm, tough exterior or periderm. Color varies from light blue-green and flesh-color to brown or purple, the browns prevailing. They are from 2 to 20mm. in diameter the usual size being 5mm. broad. Examined microscopically, the trichomes are thin and regular; diameter of the heterocysts, 5 to 8.75μ; average, 6.87μ; diameter of cells, 2.5 to 5.6μ; average, 3.56μ.

In 1871 specimens were sent to Harvard College, with inquiries as to its species. Dr. Gray replied, "The plant is *Nostoc sphæroides* of Kützing. Pray keep a look-out for it from year to year. It ought not to grow in deep water." This determination proved erroneous, for in Kützing's description the trichomes are said to be swollen between the heterocysts, which is not true of our Nostoc. In 1882 Professor S. A. Forbes, examining dredgings from the lake, found a Nostoc answering the general description of our lakeshore plant, and reported the same in *Science* for June 1, 1883, as *Nostoc pruniforme*. In reply to our inquiries, he said, "It was abundant all along the city front as far out as ten fathoms deep." He referred it to Dr. Wolle, who replied, "I judge rather by your description than by the samples sent that they are *Nostoc pruniforme*." When Dr. Wolle's' "Fresh Water Algæ" appeared, this Nostoc was not mentioned. Thinking it worthy of further attention, specimens were sent to him, to Dr. Farlow, and several others. In the correspondence which followed, the plant received various names. Dr. Wolle thought it might be *N. cæruleum*, while to others it seemed to have the characteristics of *N. Zetterstedtii* and *N. verrucosum*. Dr. Farlow, having examined both the autumnal and spring stages, writes, July, 1889, "I could not make the measurements of the plant of last year agree with those of *N. pruniforme*, nor can I now, on re-examination. Dr. Barnet, however, is inclined to believe that it is really an autumnal stage of *N. pruniforme*, although it does not agree with descriptions of the type."

It should be stated further, that the base of every thallus shows a thin incrustation of calcium carbonate.

The supply along the shore at the dates mentioned is so abundant that it can be easily provided for class use in most of the laboratories of the country. This year the plant appeared with the gale of October 23, the earliest date noted, and the specimens were the largest yet found.—C. B. ATWELL, *Evanston, Ill.*

Preliminary note on the synonomy of Entothrix grande Wolle.—Two years ago, through the kindness of Rev. Francis Wolle, Bethlehem, Penn., I received specimens of his Entothrix grande. Upon a careful microscopic examination of the material I found it to be an undescribed species of *Lemanea*. I have also had an opportunity, through the courtesy of Dr. Farlow, while at his laboratory during the past summer, of verifying my observation by an examination of *Entothrix grande* Wolle, Rab. Alg. Europ. no. 2538. The species belongs to the section of the *Lamaneaceæ*, for which Sirodot[1] retained the generic name *Lemanea* Bory. The dense coil of enveloping filaments which surround the central axis of the tube, as well as the two or three layers of cells in the cortex, shows the affinity of this species with *Lemanea catenata* Kütz. and *L. nodosa* Kütz. If the enveloping filaments of the central axis are carefully dissected away one could not fail to see the Lemanea structure. Mr. Wolle erred[2] also in associating it generically with Harvey's[3] *Tuomeya fluviatilis*. I have also to acknowledge the favor of Dr. Farlow in permitting me to examine type specimens of *Tuomeya fluviatilis* Harv. from Harvey's herbarium. Wolle's figure[4] of Tuomeya fluviatilis, which, by the way, he states is ideal, since he did not have an opportunity of examining specimens, bears not the slightest resemblance to the habit of the type species, which is more nearly that of *Batrachospermum moniliforme*, while it is also more nearly related to *Batrachospermum* in structure.

I hope in a forthcoming paper to give a more detailed account of the structure of Lemanea grandis than can be given here. I have arranged the synonymy as follows:

LEMANEA GRANDIS Atk.

Syn. *Entothrix grande* Wolle, Bull. Torr. Bot. Club, Nov. 1877.
Entothrix grande Wolle, Rab. Alg. Europ. 2538.
Tuomeya grande Wolle., Fresh Water Alg. U. S. pl. 66, figs. 2–8.—GEO. F. ATKINSON, *Auburn, Alabama.*

EDITORIAL.

Every botanist must rejoice at the grand provision that the late Mr. Henry Shaw has made for the promotion of botanical science in this country. As is doubtless known to every reader the largest part of Mr.

[1] Étude sur la Algues d'eau douce de la Famille *Lemaneaceæ*, Ann. d. Sci. 5th Ser. Bot. xvi, Paris, 1872.
[2] Fresh water algæ of the U. S., 1887.
[3] Nereis Bor. Am. III, pp. 66–67, Smithson. Cont. x, 1857.
[4] Fresh water algæ of the U. S., 1887.

Shaw's immense fortune (estimated from three to five millions) was left as an endowment of the botanic garden and the school of botany which have borne his name. Provision was made in the will for the administration of this trust by a self-perpetuating board of trustees. Some fear was felt that the magnificent garden would be given to the city of St. Louis, in which case there was little hope that it would prove any more helpful to scientific study than has the public garden of Boston. But the dispositions made by the will are all that could be desired, and the plans now sketched by the trustees are full of brightest promise. In such plans we unite, with all our readers, in bidding them Godspeed.

Here is the first large endowment of botanical research that this new country has seen, and the outcome will be looked for with profound interest. Of necessity, the policy of the trustees can only be outlined at this time, but we think all will agree that the lines are struck boldly on the canvas and that they indicate a most pleasing picture. Naturally the development must be slow. Such broad lines as these can not be filled in in a day or a year, but we hope that they will be steadily kept in view.

In the development of these plans the personality of the director of the garden is an important factor, as it evidently has been in their inception. The GAZETTE has rarely felt it proper to say anything personal, but it is justified in saying now that Mr. Shaw made no mistake in naming Dr. William Trelease as the first director of the Missouri Botanic Garden. The pre-eminently needed quality at this stage of the history of the garden is *many-sidedness*, and those who know Dr. Trelease best know that he fulfills this need. Not only has his training and experience been varied, but his investigations have been in several diverse fields, in each of which his contributions have been of incontestable value. The fact that he has thus been able to do valuable work in several lines, that he is a trained investigator, and that he is an experienced teacher, give him opportunity for a broad grasp of the problem of the best development of the garden that would be impossible for a narrower specialist. We sincerely hope that he will always have the earnest support of the trustees and the cordial co-operation of all botanists in every effort for the development of what, if rightly administered, must become a splendid center of botanical research.

OPEN LETTERS.

Eragrostis and Molinia.

Referring to the letter of Mr. Jared G. Smith in the September GAZETTE, I would say that the discovery of the grasses named (Melica Porteri and Eragrostis pilifera) within his state, is an interesting fact extending the northern range of these species, but I can not understand how this Eragrostis could have suggested a relationship with Molinia. I fail

to see any suggestive resemblance even in the gross appearance of the spikelets, or in the size, color, shape or texture of their glumes. But were they alike in all these particulars there are certain technical differences which at once separate them generically. E. pilifera is a true Eragrostis, of the section Eueragrostis, and its generic characters are strongly marked. The points separating Eragrostis from Molinia may thus be presented:

Eragrostis:	*Molinia:*
Rachilla continuous.	Rachilla articulate.
Flowering glumes 3-nerved, caducous; palea persistent.	Flowering glumes 5-nerved, falling off with the palea.
Hilum punctiform.	Hilum elongated linear.

Molinia is certainly related to Eragrostis and, according to the latest classification, stands next to it following Disanthelium, but the characters separating it are well marked and of such a nature as to exclude it entirely. To open Eragrostis—a genus already overburdened with species and therefore characterized with difficulty—to admit Molinia would be to destroy it.—F. LAMSON SCRIBNER, *Knoxville, Tenn.*

Freaks of roses.

An article in the September GAZETTE on "Freaks of roses," calls to mind a modification of a rose observed in a cemetery at Cape Girardeau, Mo., about a year ago. The stamens were mostly converted into petals, but the pistils were modified in a curious manner. Some had become leaves similar to those growing on the branches, while in others, half of the carpel was like half of a leaf, the other half remaining carpel-like, being curved inward and having a row of ovules on its margin. Still others had the upper half of the carpel altered to a leaf-like form, the lower half remaining like so much of a true pistil.—W. J. SPILLMAN, *Vincennes, Ind.*

CURRENT LITERATURE.

Scientific Papers of Asa Gray.[1]

THESE HANDSOME volumes form a worthy memorial of Dr Gray. The wealth of material has made Professor Sargent's task a difficult one, but it is hard to see how he could have done better. To those of us who loved this side of our great botanist these volumes are especially welcome. The nature of the man could not be expressed in the dry details of systematic work; but in his reviews, biographical sketches and essays the bright, genial master found free expression, and his keen but always kind criticism reveals much of the secret of his hold upon American botanists. The present volumes do not include the miscellaneous papers already collected by him in *Darwiniana*, or his systematic papers, but the remnant gives u 800 pages of delightful reading, really furnishing "the best account of the

[1] SARGENT, CHARLES SPRAGUE.—Scientific papers of Asa Gray, selected. Vol. I. Reviews of works on botany and related subjects (1834-1887), pp. viii. 397. Vol. II. Essays; Biographical sketches (1841-1886), pp. iv. 503. Houghton, Mifflin and Company, Boston and New York, 1889.

development of botanical literature during fifty years." His touch was particularly fine in biographical sketches, and that botanist could be counted fortunate whose memory has been embalmed in one of them. It is marvelous that he found time for so much outside work, but he seemed to turn with pleasure from the more exacting labors of a monograph to the writing of miscellaneous papers, which was his way of resting. Professor Sargent deserves our thanks for his work, and the volumes should be upon the shelves of every American botanist.

Minor Notices.

Dr. George Vasey and Joseph N. Rose have published a list of the plants collected by Dr. Edward Palmer in Lower California in 1889, containing the description of thirteen new species. This is a good start in the right direction, and commends itself as one of the proper outcomes of the great collection of plants being accumulated at the National Herbarium. It is but right that the collections of so indefatigable a collector as Dr. Palmer should be carefully studied and made known to botanists. The new species include two Hosackias, a Ribes, an Aplopappus, a Senecio, a Gilia, a Phacelia, a Solanum, an Antirrhinum, a Viguiera, two Encelias and a Krynitzkia.

Dr. C. C. Parry has given additional information concerning Ceanothus, in *Proc. Davenport Acad.* v. 185-194. It was obtained chiefly by a reexploration of certain regions on the Pacific coast. The care with which this work has been done is to be especially commended, and inspires great confidence in the result. *C. intricatus* Parry becomes a synonym of *C. sorediatus* H. & A.; *C. tomentosus* Parry is a new species to include what was formerly included under *C. sorediatus; C. Lemmoni* and *C. Oreuttii* are both new species; while *C. dentatus* T. & G. is better defined. This brings our species of Ceanothus to 33, or, including the Mexican species, 36.

A. P. Morgan's systematic account of N. Am. Gastromycetes has reached the second paper (Jour. Cin. Soc. Nat. Hist., April, 1889). It includes a generic table of Lycoperdaceæ (13 genera), specific descriptions under the first six (Volvatæ), and two colored plates. Two new Geasters are included, and a new genus, *Astræus*, founded upon the well-known *Geaster hygrometricus* Pers.

The second memoir of the Torrey Botanical Club is a list of marine algæ of the New Jersey coast and adjacent waters of Staten Island by Isaac C. Martindale (issued Aug. 24, 1889). Lists of marine algæ are not numerous, and this contribution will undoubtedly stimulate the study of this very interesting and beautiful group. Mr. Martindale has done his work very carefully, giving full credit for his information, and rejecting what was unreliable. The list embraces 91 genera, 183 species and 41 varieties.

NOTES AND NEWS.

SPIRÆA MILLEFOLIUM Torr. is figured in *Garden and Forest*, Oct. 23.

IN THE *Jour. Trenton Nat. Hist. Soc.* (Jan., 1889), Dr. Alfred C. Stokes publishes keys to the genera of Compositæ, the species of Solidago, and the species of Aster, as described in Gray's Synoptical Flora.

MR. J. M. MACOUN, in *Garden and Forest* (October 23), gives an interesting account of Vaccinium Vitis-Idæa in its far northern haunts. There the berry is firm and juicy and very useful to man and the larger migratory birds.

LYDIA W. SHATTUCK, for over forty years teacher of botany in Mt. Holyoke Seminary, died recently at an advanced age. She was known by correspondence to many of the older botanists whose names are prominently associated with American botany.

IN THE *Kew Bulletin* for November are printed directions for collecting and preserving fleshy fungi. Dr. M. C. Cooke writes chiefly concerning such forms as the fleshy Agarics, Baleti, etc. Dr. G. Massee deals principally with the Gasteromycetes. There seems to be more danger of destroying characters by attempting too much care than from lack of it.

PROFESSOR JOHN MACOUN calls attention (*Garden and Forest*, Oct. 30) to the fine forests of Vancouver's Island, saying that they are "without exception the finest now in Canada." It seems that they are being rapidly devastated by fires started by men who are "improving" the land. It is a good opportunity for the Canadian government to enact some wise forestry laws.

COLORLESS PREPARATIONS of plants which usually turn a dark brown on being put into alcohol may be prepared, according to de Vries, by mixing with the alcohol two per cent. of acid, such as hydrochloric. It does not interfere with the microscopic investigation of such specimens, as the acid allows the alcohol to harden the cell walls and contents as usual. Several changes of alcohol may be necessary to remove all color.

DR. T. J. W. BURGESS has published a paper, read before the biological section of the Hamilton (Canada) Association, upon "the Lake Erie shore as a botanizing ground." Giving a general account of the collectors who have visited that region and its botanical peculiarities, he gives a list of 22 lost or doubtful species, and urges upon the members of the Association that they be hunted up. A list of 108 species is also given, that are restricted in Canada to the "Lake Erie District," and another list of 26 Canadian species almost restricted to the same region.

C. F. WHEELER, of Hubbardston, Michigan, has been appointed assistant in the botanical department of the Experiment Station at the Michigan Agricultural College, in place of Eugene Davenport, who has been elected Professor of Agriculture in the same institution. Mr. Wheeler will also do excellent service in other ways, by aiding to enlarge the botanical garden, museum, and herbarium. His valuable herbarium, especially rich in Michigan plants, will become the property of the college. He will spend the winter in study at the Agricultural College, and begin his duties about the last of next February.

[1] Berichte d. deutschen bot. Gesells. vii. 1889. 298.